ATTACHMENT C

STATEMENT OF WORK

FUNCTIONAL SPECIFICATIONS

ERRATA SHEET

Statement of Work

Page 4, para 4.1 - Add the statement "A minimum of 2K bytes of CPU memory shall be reserved for future implementation of CPU memory - resident applications programs.

Page 5, para 4.1 - Add the statement "Software modules which are affected by the security requirements of paragraph 4.1.3 of the Functional Specification shall be identified as "critical". These critical modules shall be coded in such a way as to provide adequate protection against single or multiple (maximum three) bit failures which could result in a compromise. The identification of the critical modules and the proposed coding techniques to provide the required protection shall be presented at the system design review. Final coding of critical modules must be documented by an analysis of failure modes and a discussion of the adequacy of the implementation.

Functional Specifications

Page 23, para 1.5 - Change quantity of 2640B, CRT Display Terminal, to (1) one, vice (3) three. Add new line "2640A, CRT Display Terminal, quantity (2) two each.

Page 36, para 2.4 - Change "MIL-STD-188-114" to MIL-STD-188-100".

Page 101, add para 4.1.4 as follows:

"4.1.4 Program Protection

The RDT shall incorporate features that will prevent inadvertent program changes either from peripheral input/output devices or by discrete modules within the system program. The required protection may be provided through the 12892A memory protect (para 1.5) for memory resident modules and by implementation of a password or similar security code function for disc resident modules. Utilization of the memory protection, i.e., boundary settings and selection of modules, lists, and tables for protection, shall be subject to mutual agreement by the contractor and the Government's COTR."

ERRATA SHEET (continued)

Page 86, para 3.4.2.4 - Add after first paragraph "The RDT shall provide a TTY block transmission scheduler (timer) for output of TTY at 150 Bit Per Second (BPS), 300 BPS or 600 BPS rate, selectable at program assembly. The effective TTY transmission rate does not include block framing and control block data."

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1. INTRODUCTION

This Statement of Work defines the full scope of endeavor that shall be undertaken and performed by the Contractor under the terms and conditions of the RFP and contract between the Government and the Contractor. It is intended to definitize and amplify the contemplated contract and to completely specify all deliverable items and documentation.

2. SCOPE

The Contractor shall furnish all supplies, services, facilities, and software required to design, develop, test, install and place in an operational status, the Remote Data Terminal (hereinafter referred to as RDT), and shall design, develop, test, deliver, and place in an operational status all hardware and software necessary and incident thereto. The period of performance through acceptance, para 4.4.3 of the Statement of Work shall not be longer than six months from award of contract. Software furnished by the Contractor under this contract shall be implemented in Hewlett-Packard (HP) assembly language. The Government shall provide to the Contractor the system hardware listed in Functional Specification (FS) 1.5. The Contractor shall also design, develop, prepare, publish, and deliver all documentation incident thereto. The Contractor shall also design, develop, produce, and conduct, a training program for Government personnel, appropriate in complexity and content to properly prepare such personnel to employ the system for productive operations. The training program shall also prepare Government personnel to operate the system and to maintain the system software.

3 APPLICAELE DOCUMENTS

Documents applicable to the implementation of this program are the Functional Specification provided by the Government in the RFP and the Contractor's proposal. The Functional Specification outlines the system requirement and thereby constitutes the Government's definition of the RDT. The Project Management Plan called for in the Specific Instructions to Bidders shall be used to monitor and evaluate the on-going project status through the duration of the RDT contract.

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4. PHASES OF WORK

The work to be performed shall be separated into several distinct phases, and work shall only proceed in a new phase after Government approval of the completion of the current phase. These phases, listed below, are completely described in the following subsections of this document. The Implementation Phase contains subordinate approval steps which are applicable.

Phases of Work

(a) System Definition and Design Phase

(b) Implementation Phase

(c) Documentation Phase

(d) Interim Installation, Training, and Acceptance Phase

(e) Final Installation and Activation Phase

The main distinguishing characteristics of each of the above phases, and the requirements, deliverables, milestones, reviews and approvals are all described in the following portions of this work statement.

4.1 System Definition and Design Phase

The essential purpose of this phase is to translate the complete set of requirements into a set of specifications for a system. Usually, during the system definition phase, applicable software subsystems and components, each capable of performing the functions, are defined, and the performance of each is analyzed. As part of this analysis, tradeoff studies are performed in those areas where there are alternative techniques available to determine the most cost effective method of meeting the functional requirements. In the classical example of system definition there will be several candidate software systems available for consideration, and the Contractor recommends the optimum choice to the Government in a formal report which documents the various studies and analyses upon which the choice was based. A formal conference then occurs between the Contractor and the Government, usually called the System Design Review, where the various issues are considered and decisions are

made regarding the system configuration that shall be implemented. During the design phase complete specifications shall be prepared. This shall include: a complete data base definition covering topics such as file structures, access methods, data flow, access controls and authorizations, expected data volumes, and I/O service demand; a complete set of system diagrams showing data and program hierarchies and interrelationships; program specification defining each program unit in terms of its input and output, its functions, its timing constraints, error conditions and resolution, and its dependency on any other modules which may be required to accomplish its function. Individual program module size shall be restricted to the largest unit that is easily understood, and shall avoid large numbers of external calls and references where practicable. There shall be prepared, as part of the system design specification, test procedures for the System Integration Test and the System Design Specification Test setting forth the exact method of testing that shall be used upon completion of coding. The test procedure shall specify the environment in which the program shall be tested, and shall include an input data description, a description of the expected results, and a method for observing them. Where appropriate, test data blank forms shall be provided to record the results, and shall include spaces for signatures and dates for the individual performing the test, and for a test observer. The Contractor may group the design specifications by major subsystem for submission, review, and approval.

4.1.1 System Design Review (SDR)

Upon completion, the design specifications shall be submitted for review and approval by the Government. The specifications to be submitted shall include all proposed software. After review by the Government, a System Design Review shall be held to allow discussions between the Contractor and the Government. At its conclusion, all areas of the design submissions requiring change or revision shall be identified. Following the submission of revised documents incorporating the agreed changes or modifications, and upon Government approval the Contractor shall proceed to the Implementation Phase. All documents approved in this manner shall govern the work during subsequent phases.

4.2 Implementation Phase

4.2.1 Hardware Inspection and Inventory

All hardware furnished by the Government to the Contractor will be Hewlett Packard (HP) Inc. equipment. The HP equipment will be new and unused except for the manufacturer's quality control and operability demonstration for purposes of initial equipment acceptance by the Government. A complete inventory and inspection shall be made of all HDT items by the Contractor upon receipt at his facility. The inventory list shall include noun names with serial numbers down to board level. Using the inventory list, each hardware component or subsystem shall be subjected to inspection in accordance with the Contractor's standard practice. If additional components are supplied by the Contractor, or his vendor, they shall be inspected in accordance with the Contractors standard practice for incoming items of this kind and included in the inspection and inventory document. In addition, all Contractor or vendor supplied components shall be new and unused. Five copies of the inventory and inspection document will be delivered to the Government upon completion of the inventory and inspection. The inventory and inspection records shall become part of the documentation.

4.2.2 Hardware Integration and Testing

Upon completion of the inspections just described, the hardware components or subsystems shall be assembled, and component integration performed. It shall then be subjected to the Contractor's standard receiving test. In addition, hardware data rates shall be extensively checked, and results presented accenting any deviation from expected performance. The results of this testing shall be delivered to the Government upon completion of the integration and testing.

4.2.3 Hardware Maintenance

The Contractor shall be responsible for maintaining the system until successful completion of the acceptance testing (4.4.3).

The Contractor shall maintain a complete maintenance and repair history of each hardware component. These maintenance records shall be available for inspection by the Government at any time, and shall be delivered to the Government when

system development is complete. Following acceptance testing, the Government shall assume full responsibility for system maintenance.

4.2.4 Software Module Test

Individual software modules as described in the System Design Documents will be implemented and individually tested. The test results shall be forwarded as soon as the tests are completed for each module rather than in a group, because it is intended to use these reports as a measure of progress during this phase of the project. Particular emphasis shall be placed on assessment of the application function module efficiency.

4.2.5 Software Integration Test

After completion of the software module test, the modules shall be integrated and tested as a unit. These tests will be consistent with the evaluation procedures presented in the System Design Document. The tests shall be witnessed by the COTR and if the system fails to meet any of the criteria specified, or to produce the results called for in the test procedure, the test shall be halted, and the reason for the failure determined. If the failure is due to a hardware malfunction, it shall be repaired and the test repeated. If the failure is due to error in the software, the error shall be corrected, and the entire set of tests shall be repeated, starting with the unit test(s) for the program(s) involved. If the failure resulted from an error in the approved Design Specifications, an analysis shall be made to determine the impact that a design change would have on other parts of the system, and the cost of making such a change, before the Government makes a decision to make the change. In that case, the Contractor may only proceed with the change after authorization by the Contracting Officer.

If the results of the tests conform to the approved test procedure, the full set of test results, and any other pertinent documentation shall be reviewed by the Contracting Officers Technical Representative (COTR). If he agrees that the results meet the test procedure requirement, he shall approve them in writing. Upon receipt of this approval from the Contracting Officer the Contractor may proceed to the next step in the implementation phase.

4.2.6 System Design Specification Test

System test to demonstrate all major system functions specified in the System Design Specification shall be performed during this period in accordance with the approved system test procedure and the results recorded. When a problem is encountered in performing any test, the test shall be halted, and a diagnosis of the problem shall be made to determine its cause. An assessment will then be made of the impact on the results if the testing were allowed to proceed to conclusion before effecting changes to correct the problem. A full report of the problem symptoms, the test environment in which it occurred, the results of the diagnosis and the decision reached, shall be prepared and included in the test documentation. If the problem is judged to be minor, the test may proceed, and at its conclusion, the problem shall be corrected, any changes documented and the test repeated before starting the next system function test. If the changes needed to correct the problem do not require changes to the approved design specifications, the Contractor may proceed with the correction on its own authority. Otherwise, the change must be approved by the Government.

Particular emphasis shall be placed on thorough documentation that the application function requirements have been satisfied. When these tests have been completed, the Contractor shall incorporate any and all logic corrections into the system program, and prepare for conducting the Factory System Test.

4.2.7 Factory System Test

The Contractor shall design, document, and administer a comprehensive Factory System Test. The test document shall be submitted to the COTR at least 45 days prior to the time the test is scheduled to start, and shall be subject to his approval. The Government's test monitor team shall be given full access to the test area and the results of the test for the purposes of monitoring and evaluation. The Factory System Test shall be conducted at the Contractor's facility using unclassified test material to be provided by the Government. Upon written notification by the Contracting Officer that the test results are satisfactory, the Contractor shall proceed to deliver the RDT. See 4.4.

4.3 Documentation Phase

This phase is not a distinct unit of and by itself, but encompasses documentation requirements described both here and in the other phases.

4.3.1 Documents

The Contractor shall provide a minimum of five copies of all required documentation, exclusive of that provided as a part of training. None of the Contractor provided documentation shall be labeled or otherwise considered proprietary, company private, or in any way restrictive of Government use. All documentation shall be marked "FOR OFFICIAL USE ONLY". Documentation required for the RDT system shall include:

(a) The Contractors Project Management Plan

(b) System Design Document

(c) Software Documentation

(d) Inventory List and Inspection Records

(e) Hardware Integration and Test results

(f) Operators Manual

(g) Factory System Test Plan

(h) Installation and Delivery Schedule Document

(i) Maintenance Records

(j) Operator Training Plan

4.3.2 System Design Document

This document shall be prepared for the design review and shall contain all information required for the Government to make a thorough evaluation of the RDT system design. This document shall include:

(a) Systems structure in terms of function

(b) Definition of commands and functions in terms of hardware and software elements

(c) Software design, module interfaces, and integration (Apps-Dacom, WCS)

(d) File design

(e) Hardware interfaces and integration

(f) Recovery capability and survivability function

(g) Description of command functions

(h) Human factors

4.3.3 Software Documentation

The software documentation shall contain information required by the Government to maintain system software, as follows: (A thru E may be delivered in 3 ring binder form)

(a) Description of RDT software organization

(b) Description of programming conventions (subroutine linkages, etc.)

(c) Description of interfaces between applications software and the operating system

(d) Formats of data buffers, lists, queues, file headers, etc.

(e) Description of modules including detailed narrative and flowchart of each module and linkage(s) to detail the system applications program(s). Hand drawn flowcharts are acceptable as long as neatness and in depth detail are present.

(f) Program listings of all software provided by the Contractor. The program listings shall be provided in source language format and shall include descriptive comment on an instruction level.

4.3.4 Inventory List and Inspection Records

This document shall comprise the inventory list and inspection records and shall include all GFE and Contractor supplied material. See 4.2.1.

4.3.5 Hardware Integration and Test results

See statement 4.2.2.

4.3.6 Operators Manual

This manual contains information required by the RDT operator to operate the system. It shall contain:

(a) General operating procedures including but not limited to:

1. System reports format and description.
2. System logs format and description.
3. System commands and description of functions.
4. System canned messages and header formats.
5. Operator console operating instructions.
6. Peripheral operating instructions and switching procedures.

(b) System initialization

(c) System restoration and recovery instructions.

(d) Graceful system shutdown instructions.

(e) A list of alarm messages and operator action.

4.3.7 Factory System Test Plan

This test plan shall include detailed test criteria developed during the design and implementation phases, and shall include procedures for carrying out the test. It shall be submitted to the COTR at least 45 days prior to test starting date. The plan shall include the following:

(a) Establishment of test criteria and material

(b) Requirements for Government supplied test data

(c) Timing and duration

4.3.8 Installation and Delivery Schedule

The Contractor shall furnish a delivery and installation schedule 45 days prior to the delivery of the RDT to permit the Government to have all required facility modifications completed by the interim installation date. The delivery and installation schedule shall be supportive of and in confirmation of the Project Management Plan schedule.

4.3.9 Maintenance Records

See 4.2.3.

4.3.10 Operator Training Plan

The Contractor shall provide a training plan for the purpose of training communications personnel to efficiently use the RDT. The training plan shall be submitted for Government review and approval not later than 30 days prior to the scheduled presentation of the training course (4.4.2).

4.4 Interim Installation, Training, and Acceptance Phase

4.4.1 Interim Installation

The interim installation for the purposes of acceptance testing and training will be made at the Government's facility in the Washington, D.C. area. The Contractor shall produce an installation plan no later than 45 days prior to delivery of the first item of hardware, and shall prepare a delivery schedule detailing the times for delivery and installation of both hardware and software. Upon notification

by the COTR that the Factory System Test is satisfactorily completed, the Contractor shall disassemble, pack, and ship the system. Shipment shall be made at the Contractor's expense. Insurance coverage shall be provided specifically for the shipment of the RDT system at the Contractors expense. The COTR shall be notified when the shipment actually leaves the Contractor's plant with details of the waybill number and shippers name. At this time, an estimated arrival time shall also be provided by the Contractor so that arrangements may be made for offloading at the Government facility.

The Contractor shall retain full responsibility for the RDT system during the shipping process and shall arrange to have his personnel on hand at the Government facility to receive the system from the shipper when it is offloaded. The Contractor shall be responsible for supervising all work required to unpack the system and move it from the loading dock to its assigned interim installation location. The Contractor shall be responsible for connecting the system to prime power and existing communications equipment, and to perform all other services required to place the system in a fully operational condition.

4.4.2 Operator Training

The Contractor shall provide operator training in accordance with the training plan (4.3.10). Scheduling of the training shall be subject to agreement by the Contractor and the Government, however, the training shall be completed prior to system acceptance. The training shall be performed at the Government's Washington, D.C. facility and be no more than one week in duration. The Government reserves the right to videotape the training sessions. The Contractor shall provide appropriate manuals and text material for 10 students.

4.4.3 Acceptance Test

The acceptance test shall be the basis for formal acceptance of the RDT system by the Government. This test shall be conducted in an on-line mode with the Sponser's Host Data Switch (HDS) at the Government's facility in the Washington, D.C. area. This test shall span a 120 hour period of continuous operation. An interruption caused by hardware failure shall be corrected and the test continued. Test failure due to software defects shall be analyzed and

corrected and the decision to continue or re-start the test shall be made by the COTR. In no case shall acceptance testing exceed 14 calender days due to software defects. The Government shall design, document, and administer the acceptance test. The test document shall be submitted to the Contractor at least 15 days prior to the time the test is scheduled to start, and shall be subject to mutual approval. During the acceptance test, no changes to the system hardware or software shall be made without the approval of the COTR.

As a part of the acceptance process a complete inventory will be conducted of all components in the system, all software programs, all documentation, manuals, instruction books, training materials, and any other deliverables defined under the contract terms which have not previously been submitted and inventoried.

4.5 Final Installation and Activation Phase

Following formal acceptance the Contractor shall provide one person to assist in the disassembly and the repacking of the system. The Government shall transport the system to its final installation site. The Contractor shall provide one person who participated in the Washington area installation and acceptance testing, to participate in the installation, checkout, and activation at the final site. The Government shall notify the Contractor when the system has arrived on site, and the person selected shall commence travel as soon as practicable after that time. This person shall remain at the final site until one week after the system has been declared operational by the Government. In no case shall this stay exceed 30 calender days. The Government shall provide all required travel ticketing and quarters for the person participating in the final site installation and activation of the RDT system. In addition, the Government shall reimburse the Contractor, on a cost basis, for this person's subsistence, and on a time and materials basis for work performed. The Contractor's proposal shall provide the basis for costing of this effort.

4.6 Monthly Progress Reports

The Contractor shall provide within five work days after the conclusion of each month, a progress report for all accomplishments for the preceding month. This report shall update the project plan with actual performance, showing the

completion date for each activity. If a scheduled item has not been completed as planned, an explanation shall be included, with a new planned completion date. The report shall also include a summary of the work planned for the next report period. Any known problems which may affect scheduled milestone events shall be fully discussed and a plan of action included to ensure that the milestone is completed on schedule.

4.7 Milestones

Certain events are designated as milestones and constitute a set of events which are recognizable as being complete, and which provide measures for determining progress achieved by the Contractor. Each event shall have a completion date assigned to it by the Contractor in his Project Management plan.

(a) Design the RDT system (software and any recommended hardware in addition to that supplied as GFE).

Prepare the system design documents.
Prepare a development milestone chart to include software module completions with appropriate intersections.
Prepare a description of unit and integration tests.
Participate in the design review.

(b) Completion of the hardware system, and hardware component integration and testing.

(c) Completion of the software system. Software modules completed and tested, then integrated and tested.

(d) System (hardware and software) integration and testing completed.

(e) Factory system test completed.

(f) Documentation delivered.

(g) System delivery, installation, and training completed.

(h) Acceptance testing completed.

(i) Final installation and activation completed.

4.8 Deliverables

(a) The RDT system (hardware and software)

(b) System Design Document (4.1, 4.3.2)

(c) Software Documentation (4.3.3)

(d) Inventory List and Inspection Records (4.2.1, 4.3.4)

(e) Operator's Manual (4.3.6)

(f) Factory System Test Plan (4.3.7)

(g) Delivery and Installation Schedule (4.3.8)

(h) Hardware integration test results (4.2.2)

(i) Software module test results (4.2.4)

(j) Software integration test results (4.2.5)

(k) Training Plan (2, 4.4.2, 4.3.6, 4.3.10)

(l) System software program(s) in source and object forms

(m) Maintenance Records (4.2.3)

(n) Monthly Progress Reports (4.6)

4.9 Government Furnished Equipment (GFE)

The Government shall deliver the equipment and components of the RDT listed in section 1.5 (FS) to the Contractor's facility within the continental U.S. Shipment of the equipment to the contractor's facility from the Washington, D.C. area shall be initiated not later than 30 days after the award of contract. Upon satisfactory completion of the inventory (4.2.1) and inspection of the GFE, the Contractor shall assume responsibility for all GFE until delivery to the Government's facility following completion of system development.

4.10 Security

Portions of work to be performed under this contract (interim installation, acceptance testing, etc.) require Contractor personnel to have unescorted access to Government facilities. In this connection, Contractor employees selected for this effort will require appropriate Government access approvals and briefings prior to the granting of these privileges. The Contractor shall designate such individuals six months prior to the planned need for access, and shall furnish the names and appropriate personal history information to the Government at that time, so that investigation of such individuals may be completed in a timely manner to allow such access when needed.

Any classified information supplied by the Government under this contract shall require storage in a GSA approved security container, plus the added protection of a guard and/or alarm system as specified by the Contracting Officers Security Representative.

5 WARRANTY

5.1 Warranty Period

GFE excluded, for a period of one year, beginning upon completion of the acceptance tests, the Contractor warrants that any equipment or components supplied hereunder are free from defects in material and workmanship. During the warranty period, the Contractor shall repair or replace without charge, any part of the system supplied by the Contractor, which under normal conditions of use and service fails.

6 TRAINING FOR FOLLOW-ON SOFTWARE SUPPORT

The Government will assume full maintenance responsibility for the RDT upon completion of this contract. Therefore, the Contractor shall provide intensive training to two Government employees. These persons will not be experienced programmers, but will have been trained in Hewlett-Packard assembly language and basic programming techniques. The trainees shall be trained during the course of the contract in design, coding, testing, integration, and debugging of RDT software so that upon completion of the contract the trainees will be sufficiently knowledgeable of the system to be able to write, modify and maintain RDT software without further need for contractor support.

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1.1 SYSTEM SCOPE

This specification contains the requirements for a Remote Data Terminal (RDT) which will be an integral part of the Sponsor's Data Communications network. The RDT will provide a terminal capability on a full-duplex communications circuit. In normal operation the RDT shall provide a dual function for processing teletype (TTY) and data (DATA) traffic simultaneously in an interleaved mode. The RDT will consist of the equipment listed in 1.5 and such other hardware and software as is required to implement the RDT requirements specified in this RFP and included by reference or contract.

1.2 OBJECTIVES

The objectives of the RDT are:

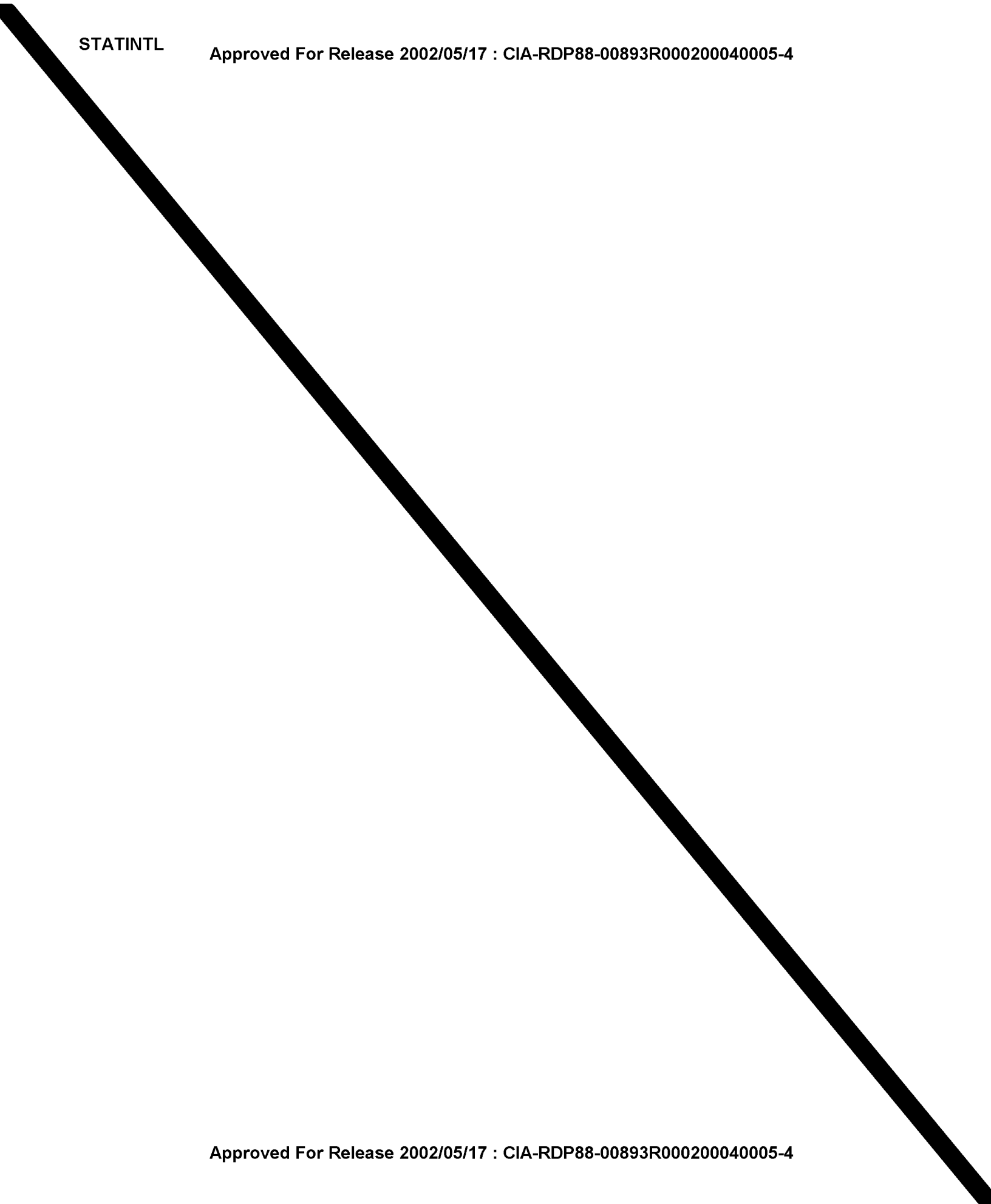
A. Increase the efficiency of remote terminal operation
B. Replace obsolete terminal equipment
C. Reduce maintenance cost
D. Provide more responsive end-user support
E. Provide a data-transparent transmission capability

1.3 PURPOSE

The functional purpose of the RDT is to provide for the transmission and reception of message data with a minimum of operator intervention. The RDT shall process data and perform the control functions in accordance with this RFP in an automatic mode. Originating (outgoing) message data will be input to the RDT from a card reader, magnetic tape drive, paper tape reader, TTY interface, and/or an operator CRT console. Terminating (incoming) message data will be recorded/reproduced on a magnetic tape drive, line printer, card punch, TTY interface, and/or an operator CRT console.

1.4 REFERENCES

Not applicable.



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1.6 FURNISHED SOFTWARE

The Contractor shall furnish the software required to meet the specifications. The Contractor shall support current unaltered versions of such software including Contractor sponsored modifications or revisions thereof, at no additional cost for the duration of this contract. The support provided shall consist of correction of errors, provision of Contractor sponsored modifications, improvements, and revisions.

1.6.1 MODIFICATIONS AND REVISIONS

The Government requires that it be provided with full documentation of all Contractor changes and/or modifications to the software provided to meet the Government's requirements. In the case of new software level releases, the Government may elect to accept the later version of software, and if accepted, software support shall be provided at no additional cost during the period of this contract. Any reprogramming for additional equipment required to accommodate such later versions shall be at the Government's expense. If the Government elects not to accept such later versions, the Contactor shall continue to correct any latent defects of operating software supplied under this contract.

1.6.2 SOFTWARE PERFORMANCE

The software furnished shall conform to and perform in accordance with the Contractor's functional descriptions and data requirements and shall meet all the specified requirements. During RDT development, all changes to the operating system shall be the responsibility of the Contractor. Documentation shall be sufficient to permit the Government to maintain the system software after RDT implementation. Software shall be delivered in error-free source form with accompanying documentation and corresponding executable object modules. During the design and development of the RDT system, particular emphasis shall be placed on the creation of quality performance software.

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